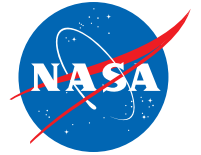


National Aeronautics and Space Administration



Lyndon B. Johnson Space Center

roundup



NASA ISS013E81590

Eyeing the storm

JUNE 2008 ■ volume 47 ■ number 6

JSCdirector

On the cover

Hurricane Gordon was captured on Sept. 15, 2006, by one of the crew members aboard the International Space Station. The center of the storm was located near 31.3 degrees north latitude and 53.3 degrees west longitude while moving northeast. At the time the photo was taken, the sustained winds were 85 nautical mph with gusts to 105 nautical mph.

As you have probably noticed from the Johnson Space Center Hurricane Emergency Information brochure, hurricane season is upon us once again.

I want to repeat some of the points I made last year at this time. Being well prepared gives each of us and our families peace of mind when a storm threatens. We should all have a well-thought-out Personal Plan of Action, including decision criteria for whether to evacuate or shelter-in-place. If and/or when you make the decision to evacuate, GO NOW! Know where you plan to go and the route you intend to take. You should also have a Disaster Preparedness Kit on hand whether you evacuate or stay home.

Please review the JSC closure policy and our criteria for deciding to close the center. I will emphasize again that the safety of our employees and their families is our highest priority, and we will make the decision to close the center as early as we reasonably can. And while state and local officials made significant improvements to their evacuation procedures after Hurricane Rita, there is no getting around the fact that evacuating millions of people during the heat of the Houston summer can be dangerous. I, once again, encourage everyone to set aside a few days of personal leave time to allow you to secure your home and evacuate as early as possible.

You should also think through your communications plan. This should include family contacts, your emergency contact information in Employee Express, and the contact information for your supervisor or NASA Headquarters Emergency Operations Center. This helps us account for all our employees after the storm has passed, as well as share critical information to help each other.

Later this month, we will roll out our new emergency notification system called SyREN (Systematic Recall and Emergency Notification). This system will be used by the Emergency Operations Center to quickly inform you of an emergency condition via e-mail, desktop computer and/or telephone. It also includes powerful reporting capabilities that will let us know whether you receive the alert.

Please review the JSC Hurricane Emergency Information brochure, develop a Personal Plan of Action to take care of your family and get your questions answered now.



A handwritten signature in blue ink, appearing to read "Mike". The signature is fluid and cursive, with a long, sweeping underline.

Spotlight on...

Evan Twyford

Aerospace Designer

Q: How long have you been with NASA?

A: Three years.

Q: What kind of hobbies or interesting things do you do away from the office?

A: Surfing, riding motorcycles, working on my car, making electronic music and roasting coffee.

Q: What is your favorite food?

A: Crawfish, mmmhmm.

Q: What is your favorite sport?

A: I love MotoGP.

Q: What is your favorite CD/music artist?

A: *A Night at the Opera* by Queen, best rock album of all time!

Q: What is the last good book or article you read?

A: I'm reading *Burning Chrome* by William Gibson. Also, *The Age of Spiritual Machines* by Ray Kurzweil is really amazing.

Q: What is your idea of a perfect vacation?

A: Sunny skies, clear blue water and a porthole window in your crew quarters to see it all.

Q: What is the best movie in your collection?

A: *City of Lost Children*, *Brainstorm* and *Tron*.

Q: What is the coolest part of your job?

A: Building wooden spaceships by hand.

Q: What does JSC mean to you?

A: Probably one of the coolest places to work of all time. Fast vehicles, great people, fun times.

Q: What do you look forward to at NASA?

A: The launch of Orion will be pretty amazing for me. On the first day of my internship, we began building the first-ever Crew Exploration Vehicle mockup out of cardboard, and soon it will fly!

Q: What is your best memory at JSC?

A: When I first had an opportunity to climb into the Apollo 17 Command Module at Space Center Houston to measure the habitable volume. That was very exciting.

Q: What is your favorite quote?

A: "The best way to predict the future is to invent it." – Alan Kay



NASA/BLAIR JSC2007E02912

Evan Twyford is an aerospace designer who first attended art school before working at NASA.

Q: What would people be surprised to know about you?

A: I went to art school and ended up here.

Q: What is a quality you most admire in people?

A: Creativity and productivity.

Q: Who are your heroes?

A: My heroes are Andrew Goldsworthy, Syd Mead, Ross Lovegrove, and Michael Jackson (the early years).

Do you know a fellow JSC team member who does something interesting or noteworthy outside of work, in addition to their day job? Would you like to nominate someone to be highlighted in the Roundup "Spotlight" page? Send your suggestion to the JSC Roundup Office mailbox at jsc-roundup@mail.nasa.gov with the person's name, work title and a brief description of why he or she should be considered.

Twyford was a runner-up in a 2007 essay contest on "Why Space Exploration is So Vital to the Nation." He was presented the award by former JSC Deputy Director Bob Cabana.



NASA/BLAIR JSC2007E08197

Vitamin D-ficiency

JSC's Nutritional Biochemistry Lab studies vitamin D in space, on Earth

By Heather Nicholson

It may not be an apple a day that keeps the doctor away, considering the recent findings that there is a lack of vitamin D in the general population.

Nutritionists at Johnson Space Center are currently studying vitamin D in individuals around the globe and those getting ready to orbit the Earth. They are finding that most folks don't have what are now considered by many in the field to be "optimal" levels of vitamin D.

NASA sends some of the healthiest humans into space. Besides the rigorous exercise they receive while training for spaceflight, their diet is closely monitored and adjusted for a healthy lifestyle that could rival even Arnold Schwarzenegger. But despite all the painstaking steps to achieve optimal health, astronauts are returning to Earth with a loss in bone and muscle density, a decline in vitamin D status, and other nutrition-related issues. A solution must be found before astronauts spend weeks, even months, on the moon and beyond.

"You could eat just about anything on a two-week space trip, not that you would want to," said Scott M. Smith, Nutritional Biochemistry Laboratory lead. "But when it comes to bone loss on longer missions, exercise has yet to work, and no one likes the pharmaceutical options because of potential side effects. As we look beyond low-Earth orbit, we cannot afford to fail at providing optimal nutrition."

Ann Rogers measures a beaker of liquid in the Nutritional Biochemistry Lab.

The everyday food pyramid taught to elementary school children isn't much different than what the astronauts abide by when eating in space: three square meals a day, plenty of carbs and protein and several servings of fruits of veggies. A vitamin D supplement is also provided. But is it possible that what works for us on Earth is working against us in space? Smith and his team think so.

"On Earth, we worry about people being iron deficient; in spaceflight, it's the opposite," Smith said. "We've been supplementing the astronauts with vitamin D ever since the crews went to the space station. There's a lot of debate on how much vitamin D to give folks."

Recent research conducted by Smith's team show that in astronauts; healthy, young non-astronauts; and a group of elderly individuals in Houston, very few people meet what are now considered optimal levels of vitamin D, which is higher today than it was defined in earlier years. It has been shown that vitamin D deficiencies are associated with increased risks of diseases.

This finding raised these questions in the general medical/scientific community: How much vitamin D does the average human need? Do U.S. food products need to be fortified with vitamin D?

The research being done by NASA's Nutritional Biochemistry Lab will help answer these questions. This includes studies during spaceflight, studies in individuals wintering in Antarctica and in folks living here in Houston. Getting the right answer is critical because while too little vitamin D is a problem, as with most nutrients, getting too much can be dangerous as well. Current space station crews get 800 International Units a day.

IN THE AIR

Some of the many experiments astronauts conduct on the International Space Station help the Nutritional Biochemistry Lab better understand the changes in human health during space travel. One experiment includes the collection of blood and urine samples during flight. Astronauts also track their body mass and complete weekly Food Frequency Questionnaires.





The Nutritional Biochemistry Lab at Johnson Space Center includes, from left: Sara Zwart, Ann Rogers, Scott Smith, Amber Harrington, Diane DeKerlegand, Patti Gillman, Barbara Rice, Geeta Kala, Amanda Messick, Grace Mathew, Tiffany Chew, YaVonne Bourbeau and Shanna Rodgers.

NASA JSC2008E039119

Another experiment sent several food products to the space station and let them sit there for up to 30 months (the last set is scheduled to return on STS-126). The purpose was to see if the vitamins and nutrients in certain foods would change in space. The experiment included broccoli au gratin, tortillas, salmon, almonds, dried apricots and vitamin supplements. Smith said the data collected does not show significant signs of nutrient loss, but the question remains for lunar/Mars missions—will higher radiation profiles and longer shelf-life requirements cause a problem in Earth food?

“At this point, this tells us that we still don’t know why nutritional status is declining in astronauts,” Smith said. “The blood and urine samples collected during flight may enlighten this further.”

Two other experiments are in the works for space station crews, including an experiment looking at the ability of limiting sodium (salt) intake as a means to reduce bone loss. And the other is looking at altering the ratio of animal protein (potassium in the diet) as a means of reducing bone loss.



NASA JSC2008E039117

Recent research shows there is a lack of vitamin D in the general population, and the Nutritional Biochemistry Lab is currently studying those effects. Shown here is team member Amanda Messick.

“This is very exciting since it is the first time we are looking at nutrition as a countermeasure, and not just a basic health requirement,” Smith said. “These have both been tested with positive results on the ground. The trick now is to see if they work in space.”

ON THE GROUND

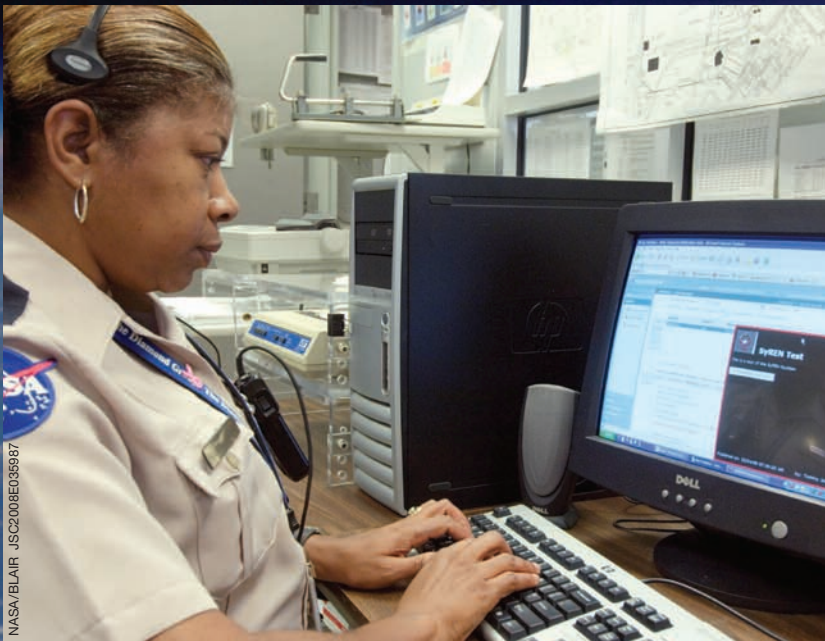
There is plenty to do on Earth, as well. To simulate zero gravity, the Nutritional Biochemistry Lab participates in bedrest studies, in which subjects lie in bed for three to four months while their bone and muscle loss is closely monitored. They also do some more exotic work with vitamin D supplementation studies in Antarctica, and NASA Extreme Environment Mission Operations studies to evaluate iron metabolism and oxidative damage in the crews living under water.

“Nutrition is most important when you are living on a closed-food system far away from home,” Smith said. “We are now at a turning point as far as nutrition goes, shifting from understanding the effects of spaceflight on nutrition to modifying nutrition to help maintain crew health.”



NASA JSC2008E039119

Geeta Kala tests samples at the Nutritional Biochemistry Lab, where results from the astronauts’ nutrition loss in space are analyzed.



LISTEN CLOSE:

By Jenna Mills

Brenda Gilbert, Security dispatcher, tests the new SyREN system.

If you haven't already heard,

Johnson Space Center recently purchased a new mass notification and alert system.

The Systematic Recall and Emergency Notification (SyREN) system will provide rapid access to information when the center is faced with a critical emergency. It can mean the difference between life and death. The current JSC Emergency Notification System (JENS) was found to be limited to only e-mail notification and a posting to the JSC internal home page, so it was time to upgrade to greater capabilities. With SyREN in place, the JENS will no longer be used.

"Things change over time," said Alan Mather, chief of the Protective Services Division. "We face emerging physical and cyber threats from ever-evolving sources, and based upon the type of threat and situation, the responses are different. There is a definite need to take advantage of new and existing technology to communicate quickly with JSC employees to effectively protect people and property. Phone trees and e-mail work but may not be appropriate for serious situations in which rapid and timely communication must be immediate to alert employees and convey information and instructions, such as evacuate or shelter-in-place."

In a partnership between the Information Resources Directorate (IRD) and the Center Operations Directorate (COD), JSC decided to improve its emergency

notification system to one that would disseminate information to employees faster and through additional communication channels. Late last year, an IRD and COD team conducted detailed market research in which several vendors of real-time communications and alerting platforms, including providers of enterprise instant messaging, were thoroughly evaluated. AtHoc, Inc. gained the highest scores for product maturity, enterprise-class features, ease of use and fastest deployment time.

AtHoc, Inc. is a recognized leader in providing enterprise-class, network-centric emergency notification systems to military, government and commercial organizations for physical security, force protection and personnel accountability. Since 1999, AtHoc, Inc. has focused entirely on providing emergency notification systems to companies across the country. They are the provider to the U.S. Air Force, U.S. Navy, U.S. Patent and Trademark Office, University of California (UCLA), Hawaii and the American Red Cross.

Using the latest in today's technology, our new sophisticated emergency system will be able to transform JSC's Internet Protocol network and all its connected devices, wired and wireless, into an alarm system in times of an emergency. From one console in the Emergency Operations Center, SyREN will launch the alert message using many communication channels simultaneously to inform employees of an impending emergency.

SyREN is at JSC

When this happens, all computers and laptops become alarms to alert employees. It will attempt to reach those who are not near a computer by using previously provided contact information such as cell phones, PDAs, Blackberries, personal e-mail accounts and home phones.

“We want to reach people with alert, protection or action information about an emergency situation,” Mather said. “If a person leaves their office, communication to their desktop computer or office telephone is ineffective. Through SyREN, we will also be able to notify employees by cell phone, Blackberry or home phone if the additional information is provided.”

“On average, this emergency notification system can reach all employees in any location within two minutes via desktop and can support tens of thousands geographically dispersed (employees) through a wide range of communication channels,” said Simon Berman, AtHoc, Inc. vice president of marketing.

Last month, SyREN was deployed to and installed in all computer workstations and laptops across the center. All employees should now see a purple icon in their Windows system tray at the bottom right corner of the screen.

Employees were also recently asked to provide additional contact information in the event of an emergency. SyREN will be able to get in touch with you to make you aware of the situation.

The voluntary information includes cell and home phone numbers, personal e-mail accounts, BlackBerries and more. While some are apprehensive about giving up their personal information, it is vital for the center to have in case of an emergency. JSC cares about the safety of all its employees and wants to ensure that each employee is accounted for and has received the latest information in regard to the emergency situation and the status of the center. The additional contact information taken from employees is saved into a secure database and never used except in reaching the intended party in an emergency situation.

Now that SyREN has been deployed and is running efficiently, JSC will schedule a monthly test to run the first Thursday of every month to assure the system is working properly. Though employees were asked to provide the additional contact information, they will not receive any test alerts to their cell phones, BlackBerries, e-mail accounts, etc., during these times. Employees who log into their JSC Domain will receive a pop-up on their desktop indicating that SyREN is conducting its monthly test, though no response will be required from the user.

For more information regarding SyREN, contact Matt Soltis in the Office of Emergency Management at 281-483-8607.

Astronaut health on moon may depend on good dusting

By Brad Thomas, *National Space Biomedical Research Institute*

Lunar dust could be more than a housekeeping issue for astronauts who visit the moon. Their good health may depend on the amount of exposure they have to the tiny particles.

To prepare for a return to the moon, researchers with the National Space Biomedical Research Institute (NSBRI) are evaluating how dust deposits in the lungs in reduced gravity to assess the health risk of long-term exposure to the particles. The findings will influence the design of lunar bases and could also provide benefits for health care on Earth, such as improved delivery of aerosol medications to the lungs.

NSBRI Human Factors and Performance Team researcher Dr. Kim Prisk said there are major questions that need to be answered.

"In the big picture, the questions are: How much goes into the lung? Where does it go? How long does it stay? And how nasty is the stuff?" said Prisk, who is an adjunct professor in the Department of Medicine at the University of California, San Diego.

During the Apollo lunar missions in the late 1960s and 1970s, the clingy particles were easily transported via spacesuits into the lunar lander following moonwalks. The amount of dust inside the vehicle was so great some astronauts reported they could smell it.

Even though there were no known illnesses due to exposure, lunar dust is a concern because it has properties comparable to that of fresh-fractured quartz, a highly toxic

substance. However, the Apollo flights lasted only a few days. During the proposed return to the moon, astronauts will be exposed to lunar dust for longer periods of time, including missions that could last months.

Due to the moon's reduced gravity and the size of its dust particles, the respiratory system's process to remove unwanted matter may not work as efficiently as it does on Earth.

"In the moon's fractional gravity, particles remain suspended in the airways rather than settling out, increasing the chances of distribution deep in the lung, with the possible



Dr. Chantal Darquenne (left) and Mark Olfert measure aerosol deposition in Janelle Fine's lungs during a lunar gravity portion of a Reduced Gravity Flight for an experiment funded by the NSBRI.

consequence that the particles will remain there for a long period of time," Prisk said.

The lungs are a highly sensitive organ because of the large surface area that delivers oxygen molecules through a thin membrane directly to the blood. The health risk to astronauts increases as dust particles go deeper into the lungs.

To conduct the research, scientists take measurements during flights on NASA's Microgravity Research Aircraft. These airplanes are used to provide short periods of reduced- and zero-gravity during a series of steep climbs and descents.

"During the portions of the flight in which gravity is reduced to levels seen on the lunar surface, we inject particles into a mouthpiece through which the study participants breathe," Prisk said. "Subjects breathe in and out, and we measure how the particles behave and how many end up inside the lung."

According to Prisk, the research flights have been beneficial so far. "With the reduced-gravity flights, we're improving the process of assessing environmental exposure to inhaled particles," he said. "We've learned that tiny particles (less than 2.5 microns) which are the most significant in terms of damage, are greatly affected by alterations in gravity."

The next step is to investigate the risks and determine ways to limit exposure. The severity of the risks will determine the level of engineering work needed to limit exposure to lunar dust, which also can cause problems for equipment.

As for benefits on Earth, the research could give scientists a better understanding of how the lungs work, improving the understanding of how particles distribute within the lungs.

"If we learn how to target drugs to specific areas inside the lung, it will be possible to achieve optimal results with small quantities of drugs delivered to exactly the right place in the lung, and it will minimize side effects," Prisk said.



Dr. Kim Prisk and Dr. Chantal Darquenne (left) measure aerosol deposition in Jeff Struthers' lungs during a lunar gravity portion of a Reduced Gravity Flight for an experiment funded by the NSBRI.



Angela Lesser and her roller derby team mates. Lesser is standing in the top row, second from the left.

As much as the outside world is fascinated by what we do every day at NASA, we are more apt to be fascinated by what fellow Johnson Space Center team members do outside of work.

At JSC, scientists, engineers and astronauts are the norm. Rocketing hardware in and out of space is the norm. What is not the norm, perhaps, is a spacesuit test engineer who will not pause in knocking you to the ground during a gritty roller derby match-up.

Angela Lesser was recently featured on ESPN for this very reason.

“ESPN was doing a feature on roller derby girls and roller derby in general, and they focused on girls with interesting jobs,” Lesser said. “They went to about seven or eight different roller derby leagues around the United States and picked out a couple of girls from each league that did some kind of cool job, and I was one of them.”

By day, Lesser is a spacesuit test engineer for ILC Dover, who toils to put astronauts into something that will fit perfectly and is fully functional for their extravehicular jaunts outside the spacecraft. Lesser enjoys running tests on the hardware and spacesuited subjects.

By night, however, things aren’t quite as peaceful when Lesser takes to the rink.

Roller derby is an American-invented contact sport and has historically been a form of sports entertainment. It is based on formation roller skating around an oval track. The sport is female-dominated and can be very rough.

“Roller derby is a game that’s played on the quad skates, as opposed to inline skates. There are two teams that play on a round track. There’s a pack of girls that are the defense and two ‘jammers’ that are the offense,” Lesser said. “Jammers try to get through the pack. The girls in the pack that are the blockers try to knock you down, and the girls on the other team are also trying to knock you down while they’re trying to help their own jammer get through.



NASA/STAFFORD JSC2008E033412

ON THE RINK OF GREATNESS

Spacesuit test engineer moonlights as roller derby skater

By Catherine Ragin

The jammer is basically the sprint skater. You get points by passing people in the pack.”

Lesser said of the sport, “It’s very, very physical ... lots of bumps and bruises and getting knocked down and stuff like that.”

However, if you are interested in getting started in the sport, you don’t have to be a professional-level skater—or even know how to skate.

“When I first started I didn’t know how to skate at all, so I began totally from scratch,” Lesser said.

Lesser’s league offers a boot camp on Monday nights for those just starting out. During the boot camp, participants do skating drills and work on agility. Then, if the person wants to continue on with the sport, she can start practicing and get drafted on a team.

For ESPN’s documentary, Lesser was able to demonstrate the unique aspects of her job wearing something she is all too familiar with—a spacesuit.

“(ESPN) came on site and they filmed me getting in the spacesuit, getting pressurized and everything, and then asked me questions while I was in the spacesuit,” Lesser said.

With the documentary, not only do viewers get a taste of the popular sport—but they also get a glimpse of the amazing

work we do at JSC and what makes us special for those on the outside looking in.



Lesser and her coworkers evaluate and test spacesuit hardware for the astronauts.



NASA/STAFFORD JSC2008E033403

Lesser is a spacesuit test engineer for ILC Dover.

JSC hosts Saturday Morning Science Community Outreach Program



By Bill Jeffs

Participants attending the Saturday Morning Science Community Outreach Program at JSC stop for a photo in Building 9.

Space food. Anthropometry and biomechanical analysis. Usability testing and analysis. Microbiology. Nutrition and biochemistry.

These were just some of the topics discussed April 26 when Johnson Space Center hosted Baylor College of Medicine's Saturday Morning Science Community Outreach Program. The visit was coordinated through JSC's Space Life Sciences Directorate.

Fifty-three middle and high school students from 10 Houston Independent School District (HISD) schools participated. They were joined by medical and graduate students from Baylor College of Medicine.

In his greeting to the students who gathered at the Gilruth Center, JSC Director Mike Coats commented on NASA's achievements during first 50 years, adding that many more discoveries will be made in the next 50 years. He exhorted the students to pursue such discoveries.

"Statistically, there has to be life all over the universe," said Coats. "I want you to get out there and find it."

Neal Pellis, NASA senior scientist for the Space Life Sciences Directorate, presented an overview of space life science activities. He discussed the directorate's work in understanding the effects of the weightless environment of space on the capabilities and limitations of humans living and working in that frontier.

"The reason we study life sciences in space is because terrestrial life has little experience in adapting to living in microgravity," said Pellis. "We need to understand the changes that humans experience in long-term space exploration and devise ways to minimize the risk to human health during and after exploration missions in space."

Then it was off to the labs.

The students visited some of the Habitability and Human Factors Labs in Building 15 and a few of the Biomedical Research and Environmental Labs in Building 37.

The work done in the Microbiology Laboratory in addressing crew health and environmental performance issues related to microbial infection and contamination caught the attention of one of the grad students.

When asked what about her visit to JSC interested her, Bonnie Youmann, a first-year graduate student at Baylor College of Medicine, said, "Definitely the Microbiology Lab and all the equipment—all the amazing technology that they have here in one room."

Microbiologist Virginia Bassinger explains to students the laboratory methods used to identify and analyze bacteria.





Microbiology Laboratory Manager Victoria Castro shows students the environmental monitoring hardware used on the International Space Station.

Dianne Hammond, senior scientist with Enterprise Advisory Services, Inc., describes the use of the infrared spectrophotometer and microscope which can be used for identifying compounds or noting changes in cells, bone and minerals to students visiting the Human Adaptation and Countermeasures Division Bioanalytical Core Laboratory.

The students also toured the International Space Station and space shuttle mockups and trainers in Building 9. Charles Bolden, retired major general in the U.S. Marines and former NASA astronaut, was on hand to provide tours of the shuttle trainers and encouraged the young people to dream big and reach for the stars.

“What mainly interested me were the full-scale models of the space shuttle,” said Darrick Bonner, a junior at Jack Yates High School. “To step inside one of them and see how the astronauts set up when they get ready to go on a mission—that was really exciting to me.”

As Bolden says, these students may not get the chance to tour JSC facilities were it not for the Saturday Morning Science program.

“As we try to explain to (the students), they are a very small group out of HISD that has thousands of kids,” Bolden said. “So we hope that they’ll take some of what they see back to their classmates and help get them motivated.”

Developed and sponsored by the Office of Diversity and Community Outreach at Baylor College of Medicine, the Saturday Morning Science Community Outreach Program began in January 2005. It is designed to help middle- through high-school students in Houston get excited about math and science and eventually pursue careers in the biomedical sciences. Fifteen inner-city HISD schools participate in the program.

The program is the vision of Dr. James Phillips, senior associate dean and professor of pediatrics at Baylor College of Medicine. He accompanied the students during their visit to JSC.

“The opportunity given to us by Johnson Space Center provided our students with an in-depth exposure to NASA and space medicine,” said Phillips. “This positive stimulation toward careers in the biosciences goes hand in hand with the goal of Saturday Morning Science, as we strive to reduce disparities in health care throughout the country. Baylor College of Medicine is extremely appreciative of JSC’s support.”



This Saturday Morning Science visit marked the second year the program has been held at JSC.

For more information about the Saturday Morning Science program, contact:

The Office of Diversity and Community Outreach
Baylor College of Medicine
One Baylor Plaza, Ste. M108, BCM365
Houston, TX 77030
713-798-8646



Students tour the International Space Station trainer in Building 9.

Coats in the trenches

Don't be surprised to see Center Director Mike Coats and his team touring Johnson Space Center offices. They recently toured labs in the ARES department, and are planning visits to other JSC departments in the coming months.

Bobby Watkins, Lucy Kranz, Mike Coats, Ellen Ochoa and Simon Clemett in the Laser Microprobe lab.



NASA JSC2008E031166



NASA JSC2008E031161

Brad Sutter and Coats in the M3EGA (Moon, Mars, Meteorite Evolved Gas Analysis) Lab.



SPREADS/NASA JSC2008E031171



Eileen Stansbery, Milt Heflin, Bobby Watkins, Lucy Kranz, Coats, Ellen Ochoa and Scott Messenger in the NanoSIMS lab.

Space Center Roundup

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